
***** G A M M A S P E C T R U M A N A L Y S I S *****

Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-2008\W6H-IMC-200

Report Generated On : 3/27/2017 1:51:17 PM

Sample Title : W6H-IMC-2008-S-P-6

Sample Description :

Sample Identification : 2008-S-P-6

Sample Type :

Sample Geometry : cylinder

Peak Locate Threshold : 3.00

Peak Locate Range (in channels) : 40 - 8192

Peak Area Range (in channels) : 40 - 8192

Identification Energy Tolerance : 1.000 keV

Sample Size : 2.355E+002 grams

Sample Taken On : 3/17/2017 12:00:00 AM

Acquisition Started : 3/27/2017 12:13:11 PM

Live Time : 1800.0 seconds

Real Time : 1800.3 seconds

Dead Time : 0.02 %

Energy Calibration Used Done On : 3/24/2017

Efficiency Calibration Used Done On : 3/27/2017

Efficiency ID : H-IMC-2008-S-P-6

***** P E A K A N A L Y S I S R E P O R T *****

Detector Name: 8566

Sample Title: W6H-IMC-2008-S-P-6

Peak Analysis Performed on: 3/27/2017 1:51:13 PM

Peak Analysis From Channel: 40

Peak Analysis To Channel: 8192

	Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
F	1	182-	193	186.78	46.89	0.82	7.69E+001	21.62	5.60E+001
M	2	294-	318	299.46	75.08	0.60	7.04E+001	21.78	8.84E+001
m	3	294-	318	308.22	77.27	0.60	6.49E+001	19.90	5.76E+001
F	4	737-	749	742.12	185.81	0.86	7.65E+001	21.42	6.01E+001
F	5	948-	957	952.90	238.54	0.87	6.16E+001	19.35	3.75E+001
F	6	1174-	1183	1179.13	295.13	0.87	2.37E+001	13.39	2.30E+001
F	7	5824-	5848	5836.09	1460.05	2.39	1.40E+002	22.96	1.53E+001

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 1.960 sigma

 ***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****

Sample Title: W6H-IMC-2008-S-P-6
 Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 Full NLB.NL

..... IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/gram)	Activity Uncertainty
K-40	0.909	1460.82*	10.66	8.03793E+000	1.48755E+000
Pb-210	0.980	46.54*	4.25	3.60046E+000	1.43461E+000
Pb-212	0.997	74.82*	10.28	6.17278E-001	2.27984E-001
		77.11*	17.10	3.33019E-001	1.22203E-001
		86.83	2.07		
		87.35	3.97		
		89.78	1.46		
		115.18	0.60		
		238.63*	43.60	1.57906E-001	5.55822E-002
		300.09	3.30		
PB-214	0.257	74.82*	5.80	1.09407E+000	4.15770E-001
		77.11*	9.70	5.87075E-001	2.21819E-001
		86.83	1.70		
		87.35	2.24		
		89.78	0.82		
		241.99	7.25		
		258.76	0.53		
		274.80	0.35		
		295.22*	18.42	1.76432E-001	1.03287E-001
		351.93	35.60		
		462.02	0.21		
		480.43	0.34		
		487.14	0.43		
		533.66	0.18		
		580.14	0.37		
		785.96	1.06		
		839.07	0.58		
Ra-226	0.978	81.07	0.20		
		83.79	0.32		
		186.21*	3.64	1.91978E+000	6.28166E-001

* = Energy line found in the spectrum.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 1.000 keV

Nuclide confidence index threshold = 0.10

Errors quoted at 1.960 sigma

 ***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/gram)	Wt mean Activity Uncertainty
K-40	0.909	8.037929E+000	1.487545E+000
Pb-210	0.980	3.600463E+000	1.434607E+000
Pb-212	0.997	1.817279E-001	5.048217E-002
PB-214	0.257	2.230857E-001	9.289163E-002
Ra-226	0.978	1.919776E+000	6.281662E-001

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.960 sigma

***** U N I D E N T I F I E D P E A K S *****

Peak Locate Performed on: 3/27/2017 1:51:13 PM
 Peak Locate From Channel: 40
 Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty	Peak Type	Tol. Nuclide
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All peaks were identified.

***** N U C L I D E M D A R E P O R T *****

Detector Name: 8566
Sample Geometry: cylinder
Sample Title: W6H-IMC-2008-S-P-6
Nuclide Library Used: C:\GENIE2K\CAMFILES\UNC 2017 Full NLB.NL

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)	Dec. Leve (pCi/gram)
+	K-40	1460.82*	10.66	1.299E+000	1.30E+000	8.038E+000	5.717E-00
	CO-60	1173.23	99.85	1.860E-001	1.53E-001	-2.662E-002	8.608E-00
		1332.49	99.98	1.532E-001		5.098E-002	6.889E-00
	CS-137	661.66	85.10	1.350E-001	1.35E-001	6.554E-002	6.257E-00
+	Pb-210	46.54*	4.25	2.124E+000	2.12E+000	3.600E+000	9.986E-00
	BI-212	288.20	0.34	1.859E+001	1.94E+000	9.524E+000	8.758E+00
		328.03	0.13	5.735E+001		2.558E+001	2.703E+00
		452.98	0.36	2.693E+001		-9.055E+000	1.268E+00
		727.33	6.67	1.942E+000		-3.788E-001	9.026E-00
		785.37	1.10	1.189E+001		-8.665E-001	5.500E+00
		893.41	0.38	3.708E+001		-2.962E+001	1.709E+00
		952.12	0.17	8.963E+001		1.337E+001	4.141E+00
		1078.62	0.56	2.483E+001		-2.926E+001	1.127E+00
		1512.70	0.29	4.518E+001		1.647E+001	1.964E+00
		1620.50	1.47	7.611E+000		-6.699E+000	3.188E+00
+	Pb-212	74.82*	10.28	4.072E-001	8.45E-002	6.173E-001	1.917E-00
		77.11*	17.10	1.953E-001		3.330E-001	9.068E-00
		86.83	2.07	2.507E+000		1.911E+000	1.200E+00
		87.35	3.97	1.255E+000		-1.328E+000	6.002E-00
		89.78	1.46	3.160E+000		-2.173E+000	1.506E+00
		115.18	0.60	6.092E+000		1.955E+000	2.875E+00
		238.63*	43.60	8.446E-002		1.579E-001	3.876E-00
		300.09	3.30	1.986E+000		-1.890E+000	9.360E-00
	BI-214	76.86	0.55	1.299E+001	2.83E-001	2.552E+001	6.278E+00
		79.29	0.91	6.087E+000		6.158E-001	2.915E+00
		89.26	0.11	4.304E+001		1.157E+001	2.054E+00
		89.81	0.21	2.196E+001		-1.511E+001	1.047E+00
		273.80	0.13	4.607E+001		4.274E+000	2.169E+00
		348.92	0.10	7.492E+001		3.898E+001	3.535E+00
		386.78	0.29	2.965E+001		3.666E+001	1.400E+00
		388.89	0.40	2.056E+001		-4.509E-002	9.672E+00
		405.72	0.17	4.539E+001		2.151E+001	2.118E+00
		454.79	0.29	3.434E+001		1.653E+001	1.618E+00
		469.77	0.13	6.460E+001		2.029E+001	3.004E+00
		609.32	45.49	2.826E-001		1.676E-001	1.328E-00
		665.45	1.53	7.009E+000		-6.120E+000	3.230E+00
		703.11	0.47	2.722E+001		1.270E+001	1.267E+00
		719.87	0.39	3.114E+001		-1.447E+001	1.442E+00
		752.85	0.13	9.850E+001		-7.180E+000	4.557E+00
		768.36	4.89	2.890E+000		-1.137E-001	1.347E+00
		786.35	0.32	3.988E+001		-3.932E+001	1.841E+00
		806.18	1.26	1.070E+001		5.916E+000	4.956E+00

Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)	Dec. Leve (pCi/gram)
BI-214	821.18	0.16	8.393E+001	2.83E-001	5.956E+001	3.880E+00
	826.45	0.12	1.140E+002		-5.357E+001	5.264E+00
	934.06	3.11	4.868E+000		5.226E-001	2.251E+00
	964.08	0.37	4.867E+001		4.392E+001	2.273E+00
	1051.96	0.31	4.836E+001		1.330E+001	2.217E+00
	1069.96	0.27	6.011E+001		3.833E+001	2.771E+00
	1120.29	14.92	1.305E+000		1.195E+000	6.078E-00
	1133.66	0.25	6.417E+001		-9.379E+000	2.941E+00
	1155.21	1.63	9.328E+000		-3.317E+000	4.246E+00
	1207.68	0.45	3.810E+001		7.246E-002	1.748E+00
	1238.11	5.83	3.545E+000		-6.348E-001	1.649E+00
	1280.98	1.43	1.173E+001		3.064E+000	5.346E+00
	1303.75	0.11	1.400E+002		-5.209E+000	6.297E+00
	1377.67	3.99	3.935E+000		7.807E-001	1.770E+00
	1385.31	0.79	2.021E+001		1.438E+000	9.105E+00
	1401.52	1.33	1.177E+001		6.606E+000	5.283E+00
	1407.99	2.39	6.565E+000		1.835E+000	2.946E+00
	1509.21	2.13	6.140E+000		1.136E+000	2.669E+00
	1538.53	0.40	2.686E+001		8.328E+000	1.125E+00
	1543.34	0.30	3.538E+001		-5.308E+000	1.482E+00
	1583.20	0.70	2.194E+001		7.930E+000	9.707E+00
	1594.75	0.27	5.285E+001		-9.228E+000	2.307E+00
	1599.37	0.32	4.120E+001		-3.641E+000	1.783E+00
	1661.27	1.05	1.189E+001		-2.098E+000	5.058E+00
	1684.01	0.21	4.875E+001		-2.338E+001	1.998E+00
	1729.59	2.88	4.486E+000		1.237E-002	1.908E+00
	1764.49	15.30	1.231E+000		6.658E-001	5.512E-00
	1838.36	0.35	3.415E+001		-3.777E+001	1.416E+00
	1847.43	2.03	6.228E+000		-3.457E+000	2.608E+00
	1873.16	0.21	5.054E+001		-3.369E+001	2.042E+00
	1896.05	0.15	9.071E+001		-8.071E+000	3.831E+00
	2118.51	1.16	0.000E+000		0.000E+000	0.000E+00
	2204.06	4.92	0.000E+000		0.000E+000	0.000E+00
	2293.38	0.31	0.000E+000		0.000E+000	0.000E+00
	2447.70	1.55	0.000E+000		0.000E+000	0.000E+00
+ PB-214	74.82*	5.80	7.217E-001	1.86E-001	1.094E+000	3.399E-00
	77.11*	9.70	3.442E-001		5.871E-001	1.599E-00
	86.83	1.70	3.052E+000		2.327E+000	1.462E+00
	87.35	2.24	2.225E+000		-2.353E+000	1.064E+00
	89.78	0.82	5.626E+000		-3.870E+000	2.682E+00
	241.99	7.25	9.705E-001		-9.532E-001	4.641E-00
	258.76	0.53	1.047E+001		1.453E+000	4.926E+00
	274.80	0.35	1.676E+001		-3.668E+000	7.892E+00
	295.22*	18.42	1.860E-001		1.764E-001	8.292E-00
	351.93	35.60	2.186E-001		2.183E-001	1.031E-00
	462.02	0.21	3.862E+001		-2.900E+001	1.793E+00
	480.43	0.34	2.909E+001		-5.623E+000	1.364E+00
	487.14	0.43	2.273E+001		1.718E+000	1.065E+00
	533.66	0.18	5.561E+001		2.374E+001	2.593E+00
	580.14	0.37	3.423E+001		1.028E+001	1.612E+00
	785.96	1.06	1.203E+001		-1.187E+001	5.555E+00

	Nuclide Name	Energy (keV)	Yield (%)	Line MDA (pCi/gram)	Nuclide MDA (pCi/gram)	Activity (pCi/gram)	Dec. Leve (pCi/gram)
+	PB-214	839.07	0.58	2.341E+001	1.86E-001	-1.503E+001	1.082E+00
+	Ra-226	81.07	0.20	2.050E+001	1.11E+000	3.017E+000	9.668E+00
		83.79	0.32	1.440E+001		4.046E+000	6.856E+00
		186.21*	3.64	1.105E+000		1.920E+000	5.186E-00
	PA-234	742.81	0.11	1.168E+002	1.97E+001	-3.199E+001	5.406E+00
		766.42	0.32	4.252E+001		-1.250E+001	1.975E+00
		1001.03	0.84	1.974E+001		1.595E+001	9.152E+00
	TH-234	63.29	3.70	1.429E+000	1.43E+000	-4.083E-001	6.739E-00
		92.38	2.13	2.277E+000		1.838E+000	1.089E+00
		92.80	2.10	2.243E+000		8.746E-001	1.071E+00
		112.81	0.21	1.762E+001		1.193E-001	8.326E+00
	U-234	53.20	0.12	5.603E+001	5.60E+001	-1.134E+001	2.637E+00
		120.90	0.04	1.041E+002		8.626E+000	4.916E+00
	U-235	72.70	0.12	4.731E+001	3.45E-001	3.102E+000	2.260E+00
		89.96	3.43	1.344E+000		-9.242E-001	6.405E-00
		93.35	5.54	8.129E-001		-4.926E-001	3.874E-00
		104.82	0.69	5.301E+000		2.868E+000	2.501E+00
		105.60	1.31	2.796E+000		1.393E+000	1.320E+00
		108.58	0.50	7.125E+000		-3.462E+000	3.359E+00
		109.19	1.66	2.134E+000		-1.435E+000	1.006E+00
		140.76	0.20	1.948E+001		-1.024E+001	9.212E+00
		143.76	10.96	3.449E-001		-3.588E-001	1.627E-00
		163.36	5.08	7.676E-001		-9.522E-002	3.614E-00
		182.62	0.39	1.446E+001		-4.165E+000	6.915E+00
		194.94	0.63	6.997E+000		-2.440E-001	3.295E+00
		202.12	1.08	4.475E+000		3.714E-001	2.116E+00
		205.32	5.02	9.611E-001		-4.756E-001	4.540E-00
		221.39	0.12	4.049E+001		-1.143E+001	1.904E+00

+ = Nuclide identified during the nuclide identification

* = Energy line found in the spectrum

> = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

 *** LINE ACTIVITY CONSISTENCY EVALUATOR ***

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 Analysis using Key Line Activities
 =====

Filename: C:\GENIE2K\CAMFILES\UNC 2017\IMC Samples\IMC-2008\W6H-IMC-200

Equation used to calculate plot: $\ln(\text{Ratio}) = A + B \cdot \ln(\text{Energy})$

where: Ratio = Activity/KL Activity

Notes:

'^' Denotes Key Line energy

* All uncertainties quoted at 1.96 sigma

Nuclide	Energy (keV)		Activity (pCi/gram)	Activity %Uncert*	Ratio[%Uncert]	A	B [uncert]
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K-40	1460.8	^	8.04E+000	18.507			
Pb-210	46.5	^	3.60E+000	39.845			
Pb-212	74.8		6.17E-001	36.934	3.909[51.021]	5.09	-0.930
	77.1		3.33E-001	36.695	2.109[50.848]		[0.537]
	238.6	^	1.58E-001	35.200	1.000[49.780]		
PB-214	74.8		1.09E+000	*****			
	77.1		5.87E-001	*****			
	295.2		1.76E-001	*****			
Ra-226	186.2	^	1.92E+000	32.721			